

REMARKS

Reconsideration of the above-identified application in view of the present amendment is respectfully requested.

By the present amendment, claim 15 has been amended to include the limitation that the stream of droplets is frozen by contacting the stream of droplets with an outer surface of a drum. The surface of the drum is maintained at a temperature below the freezing point of the solution by passing a cooling medium through the interior of the drum. Support for this limitation can be found on pages 9 and 10 of the specification.

Below is a discussion of the 35 U.S.C. §103(a) rejection as it relates to claims 1-2, 4, 6-9, 11-12 15, 16, and 18-20.

Claims 1-2, 4, 6-9, 11-12 15, 16, and 18-20 were rejected under 35 U.S.C. 103(a) as being unpatentable over Mehrotra et al. in view of Rogers et al. and Poole et al. '272.

Claim 1 recites a process for preparing a free-flowing, phase-stabilized ammonium nitrate. In the process, a solution of ammonium nitrate, a surfactant, an inert liquid, and an ammonium nitrate phase stabilizer is prepared. The ammonium nitrate, the surfactant, and the phase stabilizer are soluble in the inert liquid. The amount of surfactant in the solution is about 0.01% to about 0.15% based on the combined weight of the ammonium nitrate and the surfactant. The solution is atomized to form a stream of droplets. The droplets are freeze-dried to form agglomerates of crystals of phase stabilized ammonium nitrate. The crystals of phase stabilized ammonium nitrate in the agglomerates are coated with a film

comprising the surfactant. The agglomerates are disintegrated into separated free-flowing phase stabilized ammonium nitrate crystals coated with a film comprising the surfactant.

Claim 1 is patentable over Mehrotra et al. in view of Rogers et al. and Poole et al. '272 because Mehrotra et al. in view of Rogers et al. and Poole et al. '272 do not disclose or suggest adding about 0.01% to about 0.15% surfactant to a solution of ammonium nitrate and an ammonium nitrate phase stabilizer that is freeze-dried.

As noted in the Office Action, Mehrotra et al. teaches preparing a solution of ammonium nitrate and phase stabilizer in water, evaporating the water, and then grinding the crystallized ammonium nitrate to form a powder. Mehrotra et al. further teach that although evaporation of the water at a moderate temperature is preferred, the water may be removed by freeze-drying.

The Office Action further notes that Mehrotra et al. do not teach the details of the freeze-drying process. Mehrotra et al. also do not teach adding a surfactant to the solution of ammonium nitrate and phase stabilizer as well as forming a stream of droplets of the solution prior to freeze-drying.

The Office Action relies on Rogers et al. to teach the freeze drying process and that it would be obvious to use a surfactant with the ammonium nitrate and phase stabilizer solution taught in Mehrotra et al. Rogers et al., however, do not teach or suggest that a surfactant can be combined with a solution of ammonium nitrate and an ammonium nitrate phase stabilizer that is freeze-dried.

Rogers et al. teach a method of making ultra-fine ammonium perchlorate particles. In the method taught in Rogers et al., an aqueous solution of ammonium perchlorate and a surface active agent is prepared, sprayed into a film of an organic liquid below the freezing point of the solution, and then freeze-dried. The surface-active agent is added to the ammonium perchlorate solution of Rogers et al. to control the crystal growth of the ammonium perchlorate during freezing. There is nothing in Rogers et al. that suggests adding a surfactant to a solution of ammonium nitrate and ammonium nitrate phase stabilizer. Moreover, there is nothing in Rogers et al. and Mehrotra et al. that suggests that the addition of a surfactant to a solution of ammonium nitrate and an ammonium nitrate phase stabilizer that is freeze dried will control crystal growth and that it is even desirable to decrease the crystal growth of ammonium nitrate and an ammonium nitrate phase stabilizer during freezing.

Rogers et al. also do not teach or suggest the amount of surfactant recited in claim 1. Rogers et al. teach that the amount of surfactant combined with ammonium perchlorate can be about 0.5% to about 5% by weight of the ammonium perchlorate. This amount is substantially greater than the about 0.01% to about 0.15% weight percent of surfactant recited in claim 1. Moreover, there is nothing Rogers et al. that suggests using about 0.01% to about 0.15% by weight surfactant, and, more particularly, using about 0.01% to about 0.15% by weight surfactant with ammonium nitrate.

The Office Action argues that using the amount of surfactant is a result effective variable and the it would therefore be obvious to use an 0.01% to about 0.15% surfactant with the ammonium nitrate.

Rogers et al., however, do not teach that the amount of surfactant is a result effective variable with respect to a solution containing ammonium nitrate. Rogers et al. only teach a range of surfactant for an ammonium perchlorate solution. There is nothing in Rogers et al. that would teach that the amount of surfactant is a result effective variable for a solution of ammonium nitrate or that a solution of ammonium nitrate would be effected by the surfactant as the solution in Rogers et al. At best, Rogers et al. may teach that it is obvious to try an amount of surfactant that is between 0 and 0.5% by weight for ammonium perchlorate, but this is not taught or suggested as being applicable for solutions of ammonium nitrate. Moreover, it well established that obvious to try is not a basis for establishing obviousness.

Thus, the Office Action fails to provide a motivation or suggestion to add a surfactant to a solution of ammonium nitrate and ammonium nitrate phase stabilizer that is freeze-dried as well as adding the surfactant to a solution of ammonium nitrate and ammonium nitrate phase stabilizer in an amount of about 0.01% to about 0.15% by weight of the ammonium nitrate and the surfactant.

Thus, the prior art cited in the Office Action neither discloses or suggests all the limitations of claim 1.

Accordingly, withdrawal of the rejection of claim 1 is respectfully requested.

Claim 2 depends from claim 1 and further recites that the inert liquid is water.

As discussed above with respect to claim 1, Mehrotra et al. in view of Rogers et al. and Poole et al. '272 do not disclose or suggest adding a surfactant to a solution of ammonium nitrate and an ammonium nitrate phase stabilizer that is freeze-dried as well as adding the surfactant to a solution of ammonium nitrate and ammonium nitrate phase stabilizer in an amount of about 0.01% to about 0.15% by weight of the ammonium nitrate and the surfactant. Therefore claim 2 should be allowable for the same reasons as claim 1 and for the specific limitations recited in claim 2.

Claim 4 depends from claim 1 and further recites that the phase stabilized ammonium nitrate crystals have an average diameter of about 1 μ m to about 20 μ m.

As discussed above with respect to claim 1, Mehrotra et al. in view of Rogers et al. and Poole et al. '272 do not disclose or suggest adding a surfactant to a solution of ammonium nitrate and an ammonium nitrate phase stabilizer that is freeze-dried as well as adding the surfactant to a solution of ammonium nitrate and ammonium nitrate phase stabilizer in an amount of about 0.01% to about 0.15% by weight of the ammonium nitrate and the surfactant. Therefore, claim 4 should be allowable for the same reasons as claim 1 and for the specific limitations recited in claim 4.

Claim 6 depends from claim 1 and further recites that the phase stabilizer comprises potassium nitrate.

As discussed above with respect to claim 1, Mehrotra et al. in view of Rogers et al. and Poole et al. '272 do not disclose or suggest adding a surfactant to a solution of ammonium nitrate and an ammonium nitrate phase stabilizer that is freeze-dried as well as adding the surfactant to a solution of ammonium nitrate and ammonium nitrate phase stabilizer in an amount of about 0.01% to about 0.15% by weight of the ammonium nitrate and the surfactant. Moreover, Mehrotra et al. in view of Rogers et al. and Poole et al. '272 do not disclose or suggest that the phase stabilizer is potassium nitrate. In the process of Mehrotra et al., potassium fluoride is taught as the phase stabilizer. There is no suggestion in Mehrotra et al. that potassium nitrate can be used in the process of Mehrotra et al., specifically where the process includes the step of freeze-drying. Therefore, claim 6 should be allowable for the same reasons as claim 1 and for the specific limitations recited in claim 6.

Claim 7 depends from claim 1 and further recites that the freeze-drying step comprises cooling the stream of droplets to a temperature below the freezing point of the solution of ammonium nitrate, inert liquid, surfactant, and phase stabilizer, and sublimating the frozen droplets to remove the inert liquid from the frozen droplets and form the phase stabilized ammonium nitrate.

As discussed above with respect to claim 1, Mehrotra et al. in view of Rogers et al. and Poole et al. '272 do not

disclose or suggest adding a surfactant to a solution of ammonium nitrate and an ammonium nitrate phase stabilizer that is freeze-dried as well as adding the surfactant to a solution of ammonium nitrate and ammonium nitrate phase stabilizer in an amount of about 0.01% to about 0.15% by weight of the ammonium nitrate and the surfactant. Therefore, claim 7 should be allowable for the same reasons as claim 1 and for the specific limitations recited in claim 7.

Claim 8 depends from claim 7 and further recites that the cooling step is performed by contacting the stream of droplets with a cooling means maintained at temperature below about -130°C.

As discussed above with respect to claim 1, Mehrotra et al. in view of Rogers et al. and Poole et al. '272 do not disclose or suggest adding a surfactant to a solution of ammonium nitrate and an ammonium nitrate phase stabilizer that is freeze-dried as well as adding the surfactant to a solution of ammonium nitrate and ammonium nitrate phase stabilizer in an amount of about 0.01% to about 0.15% by weight of the ammonium nitrate and the surfactant. Therefore, claim 8 should be allowable for the same reasons as claim 1 and for the specific limitations recited in claim 8.

Claim 9 depends from claim 8 and further recites that the cooling means is a drum with an outer surface temperature of below about -130°C.

As discussed above with respect to claim 1, Mehrotra et al. in view of Rogers et al. and Poole et al. '272 do not

disclose or suggest adding a surfactant to a solution of ammonium nitrate and an ammonium nitrate phase stabilizer that is freeze-dried as well as adding the surfactant to a solution of ammonium nitrate and ammonium nitrate phase stabilizer in an amount of about 0.01% to about 0.15% by weight of the ammonium nitrate and the surfactant.

Moreover, Mehrotra et al. in view of Poole et al. '272, Rogers et al. do not disclose or suggest that the cooling means is a drum with outer surface with a temperature below about -130°C. Rogers et al. teaches using a liquid coolant to freeze the solutions. Rogers et al. do not disclose or suggest that the cooling means is the surface of a drum. Therefore, claim 9 should be allowable for the same reasons as claim 1 and for the specific limitations recited in claim 9.

Claim 11 recites a process for preparing phase-stabilized ammonium nitrate. In the process, an aqueous solution of ammonium nitrate, a surfactant, and potassium nitrate are prepared. The amount of surfactant in the solution is about 0.01% to about 0.15% based on the combined weight of the ammonium nitrate and the surfactant. The aqueous solution is atomized to form a stream of droplets. The stream of droplets is cooled to a temperature below the freezing point of the solution. The frozen droplets are sublimated to remove the water from the frozen droplets to form agglomerates of crystals of phase stabilized ammonium nitrate. The crystals of phase stabilized ammonium nitrate in the agglomerates are coated with a film of surfactant. The agglomerates are disintegrated into separated free-flowing phase stabilized

ammonium nitrate crystals coated with a film comprising the surfactant.

Claim 11 includes limitations similar to claims 1, 2, 6 and 7. As discussed above with respect to claim 1, Mehrotra et al. in view of Rogers et al. and Poole et al. '272 do not disclose or suggest adding a surfactant to a solution of ammonium nitrate and an ammonium nitrate phase stabilizer that is freeze-dried as well as adding the surfactant to a solution of ammonium nitrate and ammonium nitrate phase stabilizer in an amount of about 0.01% to about 0.15% by weight of the ammonium nitrate and the surfactant. Moreover, as discussed above with respect to claim 6, Mehrotra et al. in view of Poole et al. '272 and Rogers et al. do not disclose or suggest that the phase stabilizer is potassium nitrate. Therefore, claim 11 should be allowable for the same reasons as claim 1 and for the specific limitations recited in claim 11.

Claim 12 depends from claim 11 and further recites that the phase stabilized ammonium nitrate crystals have an average diameter of about 1 μ m to about 20 μ m.

As discussed above with respect to claim 1, Mehrotra et al. in view of Rogers et al. and Poole et al. '272 do not disclose or suggest adding a surfactant to a solution of ammonium nitrate and an ammonium nitrate phase stabilizer that is freeze-dried as well as adding the surfactant to a solution of ammonium nitrate and ammonium nitrate phase stabilizer in an amount of about 0.01% to about 0.15% by weight of the ammonium nitrate and the surfactant. Moreover, as discussed above with respect to claim 6, Mehrotra et al. in view of

Poole et al. '272 and Rogers et al. do not disclose or suggest that the phase stabilizer is potassium nitrate. Therefore, claim 12 should be allowable for the same reasons as claim 1 and for the specific limitations recited in claim 12.

Claim 15 recites a process for preparing a free-flowing, phase-stabilized ammonium nitrate. In the process, a solution of ammonium nitrate, a surfactant, an inert liquid, and an ammonium nitrate phase stabilizer is prepared. The ammonium nitrate, the surfactant, and the phase stabilizer are soluble in the inert liquid. The solution is atomized to form a stream of droplets. The stream of droplets is frozen by contacting the stream of droplets with an outer surface of a drum. The surface of the drum is maintained at a temperature below the freezing point of said solution by passing a cooling medium through the interior of the said drum. The frozen droplets are sublimated to remove the inert liquid from the frozen droplets and form agglomerates of the phase stabilized ammonium nitrate. The agglomerates are disintegrated into separated free-flowing phase stabilized ammonium nitrate crystals coated with a film comprising the surfactant.

Claim 15 contains limitations similar to claims 1 and 9. As discussed above with respect to claim 1, Mehrotra et al. in view of Poole et al. '272 and Rogers et al. do not disclose or suggest adding a surfactant to a solution of ammonium nitrate and an ammonium nitrate phase stabilizer that is freeze-dried. Moreover, Mehrotra et al. in view of Poole et al. '272 and Rogers et al., do not disclose or suggest that the droplets are frozen by contacting the stream of droplets with an outer

surface of a drum, and that the surface of the drum is maintained at a temperature below the freezing point of said solution by passing a cooling medium through the interior of the said drum. Rogers et al. teach using a liquid coolant to freeze the respective solutions taught in these references. A liquid coolant is not the outer surface of a drum, nor is it passed through the interior of the drum.

The Office Action argues that although a drum is not taught in Rogers et al., use of any variety of rotating drums, on which the coolant for freezing the solution may be flowed, would be obvious and that the comprising language of the claims are not deemed to define over the use of a drum surface with flowing Freon coolant over such drum, within the broad scope of the claim.

Claim 15, as amended, does define over the use of a drum surface with flowing Freon coolant over such drum because droplets that contact Freon would not contact the surface of a drum. Claim 15 specifically recites that the droplets are frozen "by contacting said stream of droplets with the outer surface of a drum". The coolant in claim 15 passes through the interior of the drum.

A surface of a drum is not Freon as the Office Action suggests. A surface of a drum is a solid object while Freon is liquid. Each has distinct properties. Moreover, the cooling in claim 15 is passed through the interior of the drum not the outer surface with the stream of droplets contact. Thus, Rogers et al. do not teach freezing the droplets by contacting the droplets with an outer surface of a drum.

Therefore, claim 15 should be allowable for the same reasons as claim 1 and for the specific limitations recited in claim 15.

Claim 16 depends from claim 15 and further recites that the inert liquid is water.

As discussed above with respect to claim 1, Mehrotra et al. in view of Poole et al. '272 and Rogers et al. do not disclose or suggest adding a surfactant to a solution of ammonium nitrate and an ammonium nitrate phase stabilizer that is freeze-dried. Moreover, as discussed above with respect to claim 15, Mehrotra et al. in view of Poole et al. '272 and Rogers et al., do not disclose or suggest that the droplet are cooled by contacting the droplets with the surface of a drum maintained at a temperature below the freezing point of the solution. Therefore, claim 16 should be allowable for the same reasons as claim 1 and for the specific limitations recited in claim 16.

Claim 18 depends from claim 15 and further recites that the phase stabilized ammonium nitrate crystals have an average diameter of about 1 μ m to about 20 μ m.

As discussed above with respect to claim 1, Mehrotra et al. in view of Poole et al. '272 and Rogers et al. do not disclose or suggest adding a surfactant to a solution of ammonium nitrate and an ammonium nitrate phase stabilizer that is freeze-dried. Moreover, as discussed above with respect to claim 15, Mehrotra et al. in view of Poole et al. '272 and Rogers et al., do not disclose or suggest that the droplet are cooled by contacting the droplets with the surface of a drum

maintained at a temperature below the freezing point of the solution. Therefore, claim 18 should be allowable for the same reasons as claim 1 and for the specific limitations recited in claim 18.

Claim 19 depends from claim 15 and further recites that the amount of surfactant in the solution is from about 0.01% to about 0.15% based upon the combined weight of the ammonium nitrate and the surfactant.

As discussed above with respect to claim 1, Mehrotra et al. in view of Poole et al. '272 and Rogers et al. do not disclose or suggest adding a surfactant to a solution of ammonium nitrate and an ammonium nitrate phase stabilizer that is freeze-dried. Moreover, as discussed above with respect to claim 15, Mehrotra et al. in view of Poole et al. '272 and Rogers et al., do not disclose or suggest that the droplet are cooled by contacting the droplets with the surface of a drum maintained at a temperature below the freezing point of the solution. Therefore, claim 19 should be allowable for the same reasons as claim 1 and for the specific limitations recited in claim 19.

Claim 20 depends from claim 15 and further recites that the phase stabilizer comprises potassium nitrate.

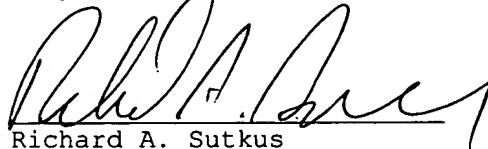
As discussed above with respect to claim 1, Mehrotra et al. in view of Poole et al. '272 and Rogers et al. do not disclose or suggest adding a surfactant to a solution of ammonium nitrate and an ammonium nitrate phase stabilizer that is freeze-dried. Moreover, as discussed above with respect to claim 15, Mehrotra et al. in view of Poole et al. '272 and

Rogers et al., do not disclose or suggest that the droplet are cooled by contacting the droplets with the surface of a drum maintained at a temperature below the freezing point of the solution. Therefore, claim 20 should be allowable for the same reasons as claim 1 and for the specific limitations recited in claim 20.

In view of the foregoing, it is respectfully submitted that the above-identified application is in condition for allowance, and allowance of the above-identified application is respectfully requested.

Please charge any deficiencies or credit any overpayment in the fees for this amendment to our Deposit Account No. 20-0090.

Respectfully submitted,



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